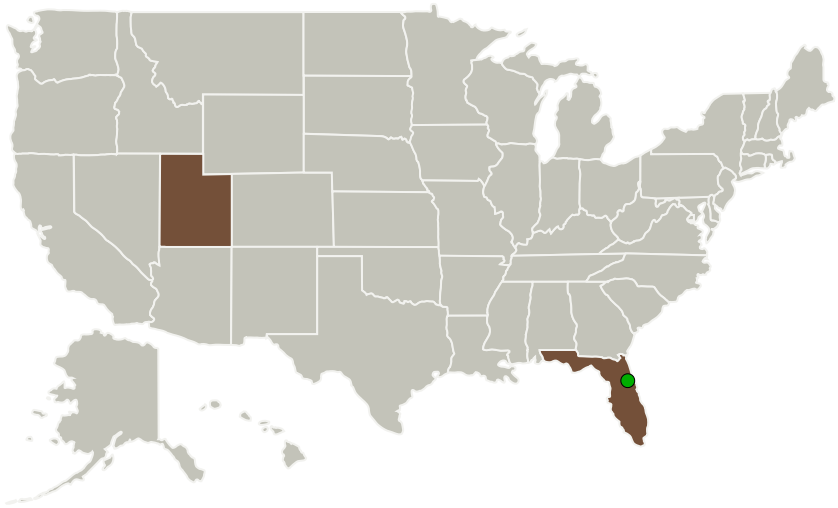
Three-Dimensional Backscatter X-Ray Imaging System, Phase II

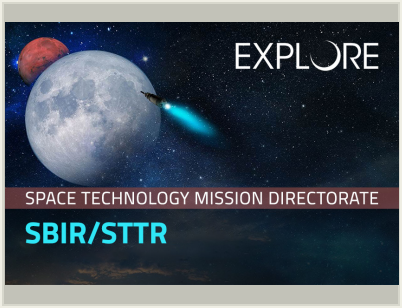
Completed Technology Project (2011 - 2013)

Project Introduction

The NASA application requires a system that can generate 3D images of non-metallic material when access is limited to one side of the material. The objective of this proposal is to demonstrate the feasibility of developing and build a new, practical, potentially portable, battery operated, self-contained Compton x-ray backscatter 3D imaging system by using a specially designed automated rotationally movable x-ray source, a 2D x-ray detector with a highly collimator system and the development of a suitable 3D processing computer model. In the proposed x-ray imaging system, the primary technical advance will be to extend methods that normally supply a 2D projected image through a sheet of material, to a 3D image with more complicated features at different depths, such as voids, cracks, corrosion or delaminations. The portability of the proposed imaging system will allow bringing it to the object to be imaged. Phase 2 will be conducted with a focus on technology transition and an understanding of what it will take to demonstrate and qualify the proposed method in a prototype for use in an actual imaging system and a realistic environment. Also in Phase II, time reduction in setup, data image acquisition, and 3D-image reconstruction analysis will be realized by remote automated control of the operation and movement of a brighter x-ray source and a state-of-the-art digital flat panel detector in conjunction with a highly collimator system.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
ARIBEX	Lead Organization	Industry	Orem, Utah
Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida
SCI Institute of the University of Utah	Supporting Organization	Academia	Salt Lake City, Utah

Primary U.S. Work Locations	
Florida	Utah

Project Transitions

July 2011: Project Start

September 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140658)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ARIBEX

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

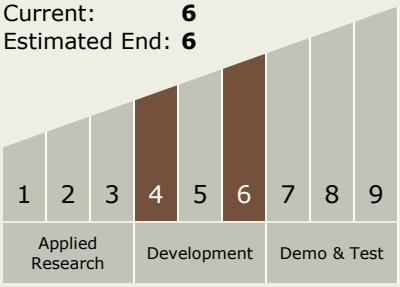
Carlos Torrez

Principal Investigator:

Arturo Reyes

Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.2 Observatories
    - TX08.2.1 Mirror Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System